

Secondary 3 Honors

Notes 12-4: Polar Graphs – Graphed by Hand

Name: _____

Period: _____

Steps to help you graph Polar Curves by hand:

- Identify the type of curve
- Find symmetry
- Identify some key features/properties of the curve
- Choose a starting point and graph it
- Choose 4 extra points to graph

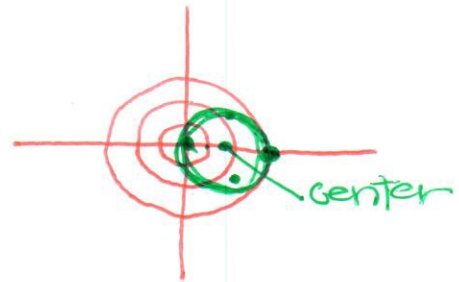
Graph the following polar curves by hand.

1. $r = 3 \cos \theta$

$r = a \cos \theta$

- circle
- symm. to x-axis
- $a = 3$
- diameter = 3
- 3 "rings"

θ	r
0	3
$\pi/4$	2.12
$\pi/2$	0
π	-3
$3\pi/2$	0

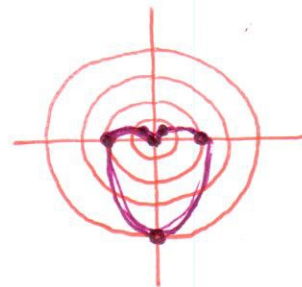


2. $r = 2 - 2 \sin \theta$

$r = a - b \sin \theta$

- Limaçon
- symm. to y-axis
- cardioid
- $a = 2$ $\frac{a}{b} = 1$
 $b = 2$
- $a + b \Rightarrow$ # of rings
 4 rings
- because -2 reflect across x-axis

θ	r
0	2
$\pi/4$	0.59
$\pi/2$	0
π	2
$3\pi/2$	4

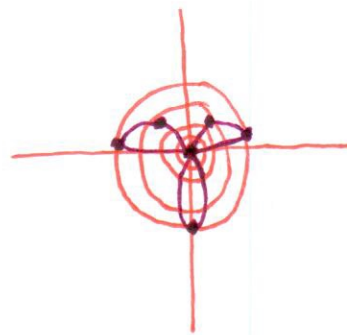


3. $r = 4 \sin 3\theta$

$r = a \sin n\theta$

- Rose curve
- y axis symmetry
- 3 petals
- 4 is length of petal
- positive direction
- Center (0,0) origin

θ	r
0	0
$\pi/4$	2.82
$\pi/2$	-4
π	0
$3\pi/2$	4
$\pi/6$	4



4. $r^2 = 25 \cos 2\theta$

$r^2 = a^2 \cos n\theta$

- Lemniscate
- $a = 5$ (length of petal)
- symm. to x-axis, y-axis, origin

- 2 petals

$r = \sqrt{25 \cos 2\theta}$

$r = \sqrt{25 \cos 2(\pi/4)}$

θ	r
0	5
$\pi/4$	0
$\pi/2$	NOT REAL
π	5
$3\pi/2$	NOT REAL
$\pi/6$	3.58

